

Revision of the Schizomida (Arachnida)

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Abstract: The family group and generic nomenclature of the arachnid order Schizomida are reviewed. A new subfamily is created, one genus synonymized, and the generic status of African species corrected. All family group and generic taxa are diagnosed, and a key to the extant subfamilies and genera is provided.

SYSTEMATIC HISTORY

Currently there are two familial and nine generic names applied to the order Schizomida. The purpose of this paper is to examine the applicability and usage of these names.

Calcitronidae and its two monotypic genera are wholly extinct and known only from Pliocene calcite deposits in Arizona. The works of Petrunkevitch (1945, 1955) and Pierce (1950, 1951) provide all the information available on these taxa.

The largely extant family Schizomidae has seven generic names applied to it. *Calcoschizomus* Pierce (1951) is apparently wholly extinct, known only from the same deposits as the Pliocene calcitronids. A summary of the history and the origin of the names of these taxa will clarify their usage.

Cambridge (1872) described the first schizomid and erected for it the family Tartarides, genus *Nyctalops*, and trivial name *crassicaudata*. In this work he also described *N. tenuicaudata*. The latter name was subsequently removed to synonymy by Pocock (1900) on the basis that *N. tenuicaudata* was actually the female of *N. crassicaudata*. Evidence is convincing that this revision is sound, although Pocock (1893) had earlier assigned *N. tenuicaudata* to another genus. Further, Cook (1899), by authority of first revisor, designated *crassicaudata* as type of the genus.

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Previous to Pocock's work Thorell (1888) elevated Cambridge's family Tartarides to tribal status and introduced the new family name Schizonotoidea. He proved that the name *Nyctalops* is a junior homonym and had been previously occupied (Hagler, 1832). In its place he provided *Schizonotus*, the nominate genus of Schizonotoidea. The spelling of the latter family name was emended to Schizonotidae by Pocock (1893). The work of Cook (1899) shows that the name *Schizonotus* is also a junior homonym, being preoccupied (Ratzeburg, 1852). In its place he used the name *Schizomus*. For the family name Schizonotidae, which was based on the junior homonym, he used the new family name Hubbardiidae, which contained a new nominate genus *Hubbardia*, however the type genus remained *Schizomus*.

Thorell (1889) erected the new genus *Tripeltis* on the basis of two new species, *T. grassii* and *T. cambridgei*, the former being originally designated as type species of the genus. The work of Cook (1899) however, shows that *Tripeltis* is a junior homonym, being previously occupied (Cope, 1886). For *Tripeltis* he provided the name *Triplomus*. Cook's revision does not stand, however, since Kraepelin (1899) offered the name *Trithyreus* for *Tripeltis* for similar reasons, just one month before Cook.

Cook's (1899) work includes data on two important schizomids. The first, and the main point of his paper, was the description of the new genus and species *Hubbardia pentapeltis*, however Hansen and Sorensen (1905) dispelled the criteria for generic distinction of this species and placed it with *Trithyreus*. Second, he mentioned a new animal which he had presented at a meeting of the Entomological Society of Washington two years previously. A printed description of *Artacarus liberiensis* never appeared under his authorship and, consequently, it was treated as a *nomen nudum* by Kraepelin (1897) and Hansen and Sorensen (1905). Kraus (1960) has located the original type series and has described the species and placed it in *Schizomus*.

Of *Nyctalops* Cambridge, *Schizonotus* Thorell, *Schizomus* Cook, *Artacarus* Cook, *Tripeltis* Thorell, *Triplomus* Cook, *Trithyreus* Kraepelin, and *Hubbardia* Cook, only *Schizomus* and *Trithyreus* remain valid. *Nyctalops*, *Schizonotus*, and *Tripeltis* are junior homonyms applied to this group. *Artacarus* and *Hubbardia* are junior subjective synonyms, and *Triplomus* is a junior objective synonym.

The original classification of Cambridge (1872) included the family name Tartarides; there was no nominal genus, but the type genus *Nyctalops* was fixed by monotypy. Thorell (1888) elevated Tartarides to tribal status, but did not use a nominate-type family name. He used the new name Schizontoidea, which is invalid because the nominate genus *Schizonotus* was later shown to be a junior homonym. Family Hubbardiidae, which Cook (1899) offered to replace Schizonotidae, was also not allowable because its nominate type genus was later

decided to be a junior subjective synonym of *Schizomus*. The family name Schizomidae has been erroneously attributed to Chamberlin (1922). Hansen and Sorensen (1905) offered the name Schizomoidae to replace Hubbardiidae. The original spelling was emended to Schizomidae by Gravely (1915). The family name Tartarides should have been conserved from the start by Thorell and given its proper suffix, but since the name has been out of general usage, the name Schizomidae should be used.

In the same publication that Chamberlin made his belated revision of family names he also described a new genus and species of schizomid from Puerto Rico. He characterized his new genus *Stenochrus* by the lack of the mesopeltidial plates which are present in all other known species. A reexamination of the type series of *Stenochrus portoricensis* reveals that this species does indeed have the mesopeltidial plates that Chamberlin reported to be absent. Most of the specimens in the type series are strongly bent upward, causing the metapeltidial plate to become unnaturally closely associated with the posterior margin of the carapace (propeltidium). This flexure results in the mesopeltidial plates being reflected underneath the metapeltidium. I examined all of the specimens available and in all but one was able to find at least some evidence of the mesopeltidial plates, though in some it is rather obscure. In light of these observations this animal fits perfectly well in the genus *Schizomus*. Hereafter this species should be referred to as *Schizomus portoricensis* (Chamberlin, 1922).

Since 1922 three Recent genera have been described. *Megaschizomus* Lawrence (1969) is based on two African species, *Agastoschizomus* Rowland (1971) and *Heteroschizomus* Rowland (1973) are based on Mexican species. I have examined paratypes of the African *Megaschizomus mossambicus* (Lawrence) and have found a remarkable similarity between the latter genus and *Agastoschizomus*. While they bear the basic differences allowing their generic distinction I have found it most reasonable to place these two genera in a common subfamily of Schizomidae, separate from *Trithyreus*, *Schizomus*, and the extinct *Calcoschizomus*. I designate the new subfamily Megaschizominae based on the nominate and type genus *Megaschizomus*, the type species of which is *Schizomus mossambicus* Lawrence (1958). I have discussed this combination with Dr. Lawrence, who has seen specimens of *Agastoschizomus lucifer*, and he agrees with this decision.

Lawrence (1969), in his revision of the African schizomids, makes the decision that there do not exist good criteria for maintenance of both *Trithyreus* and *Schizomus*. Unfortunately, Lawrence apparently missed the earlier revision of a similar nature by Mello-Leitao (1931). Mello-Leitao reasoned that the two genera should be reduced to subgenera and that only the genus *Schizomus* should stand. While I find his criteria faulty, and do not accept this general revision, he nonetheless produced a revision that is applicable to African fauna.

I do not question Lawrence's decision to unite applicable African species

into one genus, but it seems he, like Mello-Leitao, has picked the younger generic name to survive. *Trithyreus* Kraepelin dates to March, 1899, whereas *Schizomus* Cook dates to April, 1899. Under the law of priority a genus group taxon formed by the union of two or more genus group taxa takes the oldest valid name among those of its components; Art. 23(e), ICZN. My nominal objective revision of African species requires a reevaluation of a secondary homonym renamed in Lawrence's and Mello-Leitao's revisions. The union of the two genera in Africa caused *T. cavernicola* Hansen (1926) to become *S. cavernicola* (Hansen), a name combination which previously existed from Gravely (1912). Both revisors correctly changed the junior *cavernicola* to *S. hanseni* and took authorship. But since *Trithyreus* is the proper genus the junior secondary synonym *T. cavernicola* Hansen must be reestablished as the valid name of the taxon. The names *S. hanseni* Lawrence and *S. hanseni* Mello-Leitao then become junior objective synonyms and mutual primary homonyms.

A number of specific new combinations must be designated, and as a result of Lawrence's and Mello-Leitao's work *Artacarus liberiensis* Cook must be treated as a synonym of *Trithyreus* rather than *Schizomus*.

African Schizomidae Hansen and Sorensen, 1905

Subfamily Schizominae Hansen and Sorensen, 1905

1. *Trithyreus liberiensis* (Cook), 1899 NEW COMBINATION
Artacarus liberiensis Cook, 1899
Schizomus liberiensis, Kraus, 1960
Schizomus liberiensis, Lawrence, 1969
2. *Trithyreus similis* (Hirst), 1913 NEW COMBINATION
Schizomus similis Hirst, 1913
Schizomus similis, Mello-Leitao, 1931
Schizomus similis, Lawrence, 1969
3. *Trithyreus latipes* (Hansen), 1905 NEW COMBINATION
Schizomus latipes Hansen, 1905
Schizomus latipes, Mello-Leitao, 1931
Schizomus latipes, Lawrence, 1969
4. *Trithyreus montanus* (Hansen), 1910 NEW COMBINATION
Schizomus montanus Hansen, 1910
Schizomus montanus, Mello-Leitao, 1931
Schizomus montanus, Lawrence, 1969
5. *Trithyreus africanus* Hansen, 1905
Trithyreus africanus Hansen, 1905
Schizomus africanus, Mello-Leitao, 1931
Schizomus africanus, Lawrence, 1969
6. *Trithyreus brevicauda* Hansen, 1921
Trithyreus brevicauda Hansen, 1921
Schizomus brevicauda, Mello-Leitao, 1931
Schizomus brevicauda, Lawrence, 1969

7. *Trithyreus cavernicola* Hansen, 1926
Trithyreus cavernicola Hansen, 1926
Schizomus henseni Mello-Leitao, 1931 NEW SYNONYMY
Schizomus henseni Lawrence, 1969 NEW SYNONYMY
8. *Trithyreus ghesquierei* Giltay, 1935
Trithyreus ghesquierei Giltay, 1935
Schizomus ghesquierei, Lawrence, 1969
9. *Trithyreus parvus* Hansen, 1921
Trithyreus parvus Hansen, 1921
Schizomus parvus, Mello-Leitao, 1931
Schizomus parvus, Lawrence, 1969
10. *Trithyreus machadoi* (Lawrence), 1958 NEW COMBINATION
Schizomus machadoi Lawrence, 1958
Schizomus machadoi, Lawrence, 1969
11. *Trithyreus schoutedeni* Roewer, 1954
Trithyreus schoutedeni Roewer, 1954
Schizomus schoutedeni, Lawrence, 1969
12. *Trithyreus nidicolus* (Lawrence), 1969 NEW COMBINATION
Schizomus nidicolus Lawrence, 1969
13. *Trithyreus vadoni* (Lawrence), 1969 NEW COMBINATION
Schizomus vadoni Lawrence, 1969
14. *Trithyreus mediocriter* (Lawrence), 1969 NEW COMBINATION
Schizomus mediocriter Lawrence, 1969
15. *Trithyreus madagassus* (Lawrence), 1969 NEW COMBINATION
Schizomus madagassus Lawrence, 1969
16. *Trithyreus tenuipes* (Lawrence), 1969 NEW COMBINATION
Schizomus tenuipes Lawrence, 1969
17. *Trithyreus virescens* (Lawrence), 1969 NEW COMBINATION
Schizomus virescens Lawrence, 1969
18. *Trithyreus pauliani* (Lawrence), 1969 NEW COMBINATION
Schizomus pauliani Lawrence, 1969
19. *Trithyreus vinsoni* (Lawrence), 1969 NEW COMBINATION
Schizomus vinsoni Lawrence, 1969
20. *Trithyreus milloti* (Lawrence), 1969 NEW COMBINATION
Schizomus milloti Lawrence, 1969
21. *Trithyreus remyi* (Lawrence), 1969 NEW COMBINATION
Schizomus remyi Lawrence, 1969
22. *Trithyreus benoiti* (Lawrence), 1969 NEW COMBINATION
Schizomus benoiti Lawrence, 1969

Subfamily Megaschizominae Rowland, NEW SUBFAMILY

23. *Megaschizomus mossambicus* (Lawrence), 1958
Schizomus mossambicus Lawrence, 1958
Megaschizomus mossambicus, Lawrence, 1969
24. *Megaschizomus zuluanus* (Lawrence), 1947
Schizomus zuluanus Lawrence, 1947
Megaschizomus zuluanus, Lawrence, 1969

SYSTEMATICS

Order Schizomida Petrunkevitch, 1945

Colopyga Cook, 1899

Family Schizomidae Hansen and Sorensen, 1905

Tartarides Cambridge, 1872, Ann. and Mag. Nat. Hist., Ser. 4, **10**:410. (nom. obl.)

Schizonotidae Thorell, 1888, Ann. Mus. Civ. Genova, **26**:358. [nom. correct. Pocock, 1893 (ex Schizonotoidae Thorell, 1888, nom. imperf.)] (nom. based on jun. hom.)

Hubbardiidae Cook, 1899, Proc. Ent. Soc. Wash., **4**:249. (nom. obl.) (nom. based on jun. subj. syn.)

Schizomidae Hansen and Sorensen, 1905, Ark. fur Zool., **2**:4. [nom. correct. Gravely, 1915 (ex Schizomoidae Hansen and Sorensen, 1905, nom. imperf.)]

Schizomidae Chamberlin, 1922, Proc. Biol. Soc. Wash., **35**:11. (jun. prim. hom.)

TYPE: *Nyctalops crassicaudata* Cambridge, 1872.

DIAGNOSIS: Tarsus of leg one, seven-segmented; tarsi of legs two to four, three-segmented; flagellum one to two segmented in males, one to four segmented in females.

Subfamily Schizominae Hansen and Sorensen, 1905 [nom. transl. Rowland, herein (ex Schizomidae Hansen and Sorensen, 1905)].

DIAGNOSIS: Chelicerae with six to ten teeth on fixed finger; flagellum one segmented in males, one segmented in females (though two to three annulations may be present, there is no dividing membrane between segments).

Genus *Schizomus* Cook, 1899

Nyctalops Cambridge, 1872, Ann. and Mag. Nat. Hist., Ser. 4, **10**:410. (jun. hom.) Type; *N. crassicaudata* (SD Cook, 1899)

Schizonotus Thorell, 1888, Ann. Mus. Civ. Genova, **26**:358. (jun. hom.) [nom. subst. pro *Nyctalops* (non *Nyctalops* Wagler, 1832)]

Schizomus Cook, 1899, Proc. Ent. Soc. Wash., **4**:249. [nom. subst. pro *Schizonotus* (non *Schizonotus* Ratzeburg, 1852)]

Stenochrus Chamberlin, 1922, Proc. Biol. Soc. Wash., **35**:11. (jun. subj. syn.) Type; *S. portoricensis* Chamberlin, Monotypy. NEW SYNONYMY

TYPE: *Nyctalops crassicaudata* Cambridge, 1872, = *Schizomus crassicaudatus* (Cambridge), 1872.

DIAGNOSIS: Metapeltidium entire (some species of African *Trithyreus* have metapeltidium entire); not present in Africa.

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FIG. 1. Mesal aspect of chelicera of *Schizomus mexicanus* Rowland, 1971, a typical representative of the Schizominae. Note the number of teeth on fixed digit.

FIG. 2. Mesal aspect of chelicera of *Agastoschizomus lucifer* Rowland, 1971, a representative of the Megaschizominae. Note the number of teeth on fixed digit.

FIG. 3. Lateral aspect of flagellum of female *Schizomus* sp., a typical representative of the Schizominae. Note the presence of annulations, and absence of segmentation.

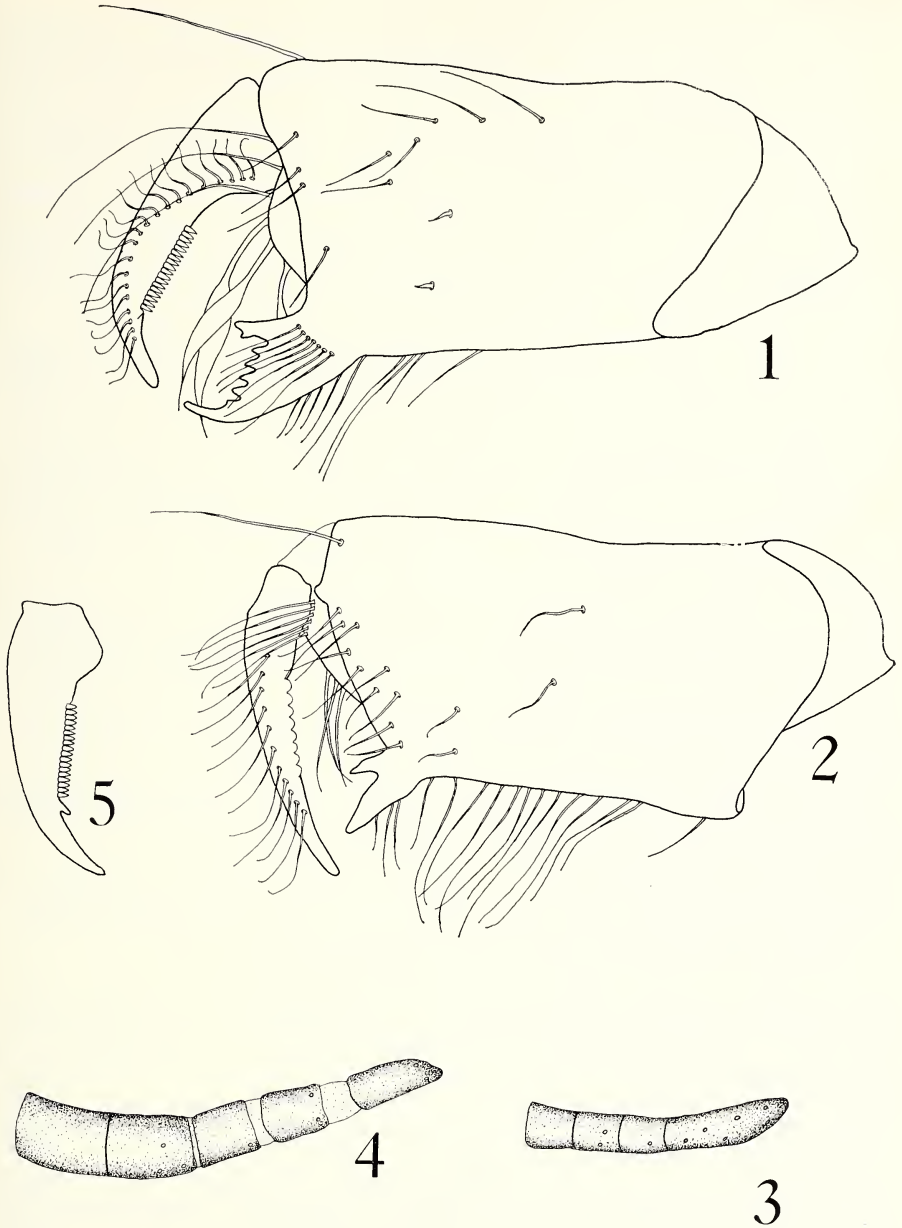


FIG. 4. Lateral aspect of flagellum of female *Agastoschizomus lucifer*. Note the presence of segmentation, marked by the occurrence of dividing membranous areas.

FIG. 5. Mesal aspect of movable finger of chelicera of *Megaschizomus mossambicus* (Lawrence), 1958, a representative of the Megaschizominae. Note the internal tooth file which is absent in *Agastoschizomus* (Fig. 2).

Genus *Trithyreus* Kraepelin, 1899

Tripeltis Thorell, 1889, Ann. Mus. Civ. Genova, **27**:554. (jun. hom.) Type; *T. grassii* (OD)
Trithyreus Kraepelin, 1899, in Das Tierreich, **8**:234. [nom. subst. pro *Tripeltis* (non
Tripeltis Cope, 1886)]

Tripломus Cook, 1899, Proc. Ent. Soc. Wash., **4**:250. (jun. obj. syn.) [nom. subst. pro
Tripeltis (non *Tripeltis* Cope, 1886)]

Hubbardia Cook, 1899, Proc. Ent. Soc. Wash., **4**:250. (jun. subj. syn.) Type; *H. pentapeltis*
Cook, Monotypy

Artacarus Cook, 1899, Proc. Ent. Soc. Wash., **4**:254. (jun. subj. syn.) Type; *A. liberiensis*
Cook, Monotypy

Schizomus Cook, 1899, Proc. Ent. Soc. Wash., **4**:250. [jun. subj. syn. (in part)]

TYPE: *Tripeltis grassii* Thorell, 1889 = *Trithyreus grassii* (Thorell), 1889.

DIAGNOSIS: Metapeltidium divided (some species of African *Trithyreus* have metapeltidium entire); all African species of this subfamily belong in this genus.

Genus *Calcoschizomus* Pierce, 1951

Calcoschizomus Pierce, 1951, Bull. So. Cal. Acad. Sci., **50**:41. Type; *C. latisternum* Pierce,
Monotypy

DIAGNOSIS: Flagellum not annulated or segmented; Pliocene.

Genus *Heteroschizomus* Rowland, 1973

Heteroschizomus Rowland, 1973, Occas. Papers Mus., Texas Tech Univ., 11. Type; *H.*
goodnightorum Rowland, 1973 (OD)

DIAGNOSIS: Abdominal segments seven to eleven extremely elongate.

Subfamily Megaschizominae Rowland, NEW SUBFAMILY

DIAGNOSIS: Chelicerae with two to three teeth on fixed fingers; flagellum one to two
segmented in males, three to four segmented in females.

Genus *Megaschizomus* Lawrence, 1969

Megaschizomus Lawrence, 1969, J. Nat. Hist., **3**:257. Type; *Schizomus mossambicus*
Lawrence, 1958 (OD) = *Megaschizomus mossambicus* (Lawrence), 1958

DIAGNOSIS: Chelicerae with three teeth on fixed finger, movable finger with internal tooth
file; flagellum two segmented in males, three segmented in females.

Genus *Agastoschizomus* Rowland, 1971

Agastoschizomus Rowland, 1971, Ass. Mex. Cave Stud. Bull., **4**:13. Type; *A. lucifer*
Rowland, Monotypy

DIAGNOSIS: Chelicerae with two teeth on fixed finger, movable finger without internal tooth
file; flagellum one segmented in males, four segmented in females.

Family Calcitronidae Petrunkevitch, 1945

Calcitronidae Petrunkevitch, 1945, Am. Jour. Sci. **243**:323.

TYPE: *Calcitro fisheri* Petrunkevitch, 1945.

DIAGNOSIS: Tarsus of leg one, seven-segmented; leg two, five-segmented; legs three and four, four-segmented; flagellum three to seven segmented.

Genus *Calcitro* Petrunkevitch, 1945

Calcitro Petrunkevitch, 1945, Am. Jour. Sci. **243**:323. Type; *C. fisheri* Petrunkevitch, Monotypy

DIAGNOSIS: Flagellum three segmented; Pliocene.

Genus *Onychothelyphonus* Pierce, 1950

Onychothelyphonus Pierce, 1950, Bull. So. Cal. Acad. Sci. **49**:102. Types; *O. bonneri* Pierce, Monotypy

DIAGNOSIS: Flagellum seven segmented; Pliocene.

The following key separates the extant family group and generic taxa of the Schizomidae.

1. Chelicerae with 6 to 10 teeth on the fixed finger (Fig. 1); flagellum 1 segmented (there may be two or three annulations present on the female's flagellum, but they have no dividing membranous area) (Fig. 3) 2. Schizominae Hansen and Sorensen
Chelicerae with 2 to 3 teeth on fixed finger (Fig. 2); flagellum 1 to 2 segmented in males, 3 to 4 segmented in females (Fig. 4)
..... 3. Megaschizominae Rowland, NEW SUBFAMILY
2. Metapeltidium entire; not African 4
Metapeltidium divided into two lateral plates by a median suture; all African species are in this genus *Trithyreus* Kraepelin
3. Chelicerae with 3 teeth on fixed fingers; flagellum 2 segmented in males, 3 segmented in females; chelicerae with an internal tooth file on movable finger (Fig. 5)
..... *Megaschizomus* Lawrence
Chelicerae with 2 teeth on fixed finger; flagellum 1 segmented in males, 4 segmented in females; chelicerae without an internal tooth file on movable finger (Fig. 2)
..... *Agastoschizomus* Rowland
4. Abdominal segments seven to eleven similar to other abdominal segments .. *Schizomus* Cook
Abdominal segments seven to eleven extremely elongate *Heteroschizomus* Rowland

DISCUSSION

The poorly diagnosed genera *Schizomus* and *Trithyreus* have been criticized by various authors. The question of generic rank for the single character used in the diagnosis has been an argument of some (Hansen and Sorensen, 1905; Mello-Leitao, 1931). However, a more objective criticism is that the taxa based on this character probably do not typify discrete phyletic units. Indeed, I have found that this character may vary within specimens of the same species. Dr. Lawrence has decided along these lines that African species exclusive of *Megaschizomus* should be relegated to a single genus. While I do not question this judgment I have not extended this revision to North American forms. It will be necessary to assess the schizomid fauna of the South Pacific, West Indies, South America, and Central America before a revision of these problematic genera in North America can be determined.

Literature Cited

- CAMBRIDGE, O. P. 1872. On a new family and genus and two new species of Thelyphonidea. *Ann. and Mag. Nat. Hist.*, Ser. 4, **10**:409-413, pl. 22.
- CHAMBERLIN, R. V. 1922. Two new American arachnids of the order Pedipalpida. *Proc. Biol. Soc. Wash.*, **35**:11-12.
- COOK, O. F. 1899. *Hubbardia*, a new genus of Pedipalpi. *Proc. Ent. Soc. Wash.*, **4**:249-261, pl. 3.
- GRAVELY, F. H. 1912. Notes on Pedipalpi in the collection of the Indian Museum. IV. New Oriental Tartarides. *Rec. Ind. Mus.*, **7**:107-110.
- . 1915. Notes on the habits of Indian insects, myriapods and arachnids. *Rec. Ind. Mus.*, **11**:516-539, pls. 22-25.
- HANSEN, H. J. AND SORENSEN, W. 1905. The Tartarides, a tribe of the order Pedipalpi. *Ark. fur Zool.*, Bd. 2, No. **8**:1-78, pls. 1-7.
- KRAEPELIN, K. 1897. Revision der Uropygi (Thelyphonidae auct.) *Abh. Gebiete Naturwiss. Naturwiss. Ver. Hamburg.* **15**:1-60.
- . 1899. In *Das Tierreich*, Scorp. u. Pedip., **8**:233-235.
- KRAUS, O. 1960. Uber "*Artacarus*" *liberiensis* Cook 1899 (Arach., Pedipalpi-Schizopeltidia). *Senck. Biol.* **41**($\frac{1}{2}$):103-107.
- LAWRENCE, R. F. 1969. The Uropygi (Arachnida: Schizomidae) of the Ethiopian region. *J. Nat. Hist.*, **3**:217-260.
- MELLO-LEITAO, C. 1931. Pedipalpos do Brasil. *Arch. Mus. Nac.*, **33**:9-72.
- PETRUNKEVITCH, A. 1945. *Calcitro fisheri*. A new fossil arachnid. *Am. Journ. Sci.* **243**:320-329, pl. 1.
- . 1955. Arachnida. In *Treatise on Invertebrate Zoology*. Geo. Soc. Am. Univ. Kansas Press. 43-162.
- PIERCE, W. D. 1950. Fossil arthropods from onyx marble. *Bull. So. Cal. Acad. Sci.*, **49**(3):101-104, pl. 34.
- . 1951. Fossil arthropods from onyx marble. *Bull. So. Cal. Acad. Sci.*, **50**(1):34-49, pls. 14-18.
- POCOCK, R. I. 1893. On some points in the morphology of the Arachnida (s.s.), with notes on the classification of the group. *Ann. and Mag. Nat. Hist.* Ser. 6. **11**:1-18, pls. 1-2.
- . 1900. Arachnida. In *The Fauna of British India, Including Ceylon and Burma*. Taylor and Francis, London. 118-122.
- ROWLAND, J. M. 1971. *Agastoschizomus lucifer*, a new genus and species of cavernicole schizomid (Arachnida, Schizomida) from Mexico. *Ass. Mex. Cave Stud. Bull.*, **4**:13-17.
- . 1973. A new genus and several new species of Mexican schizomid (Schizomida: Arachnida). *Occas. Papers Mus., Texas Tech Univ.*, 11.
- THORELL, T. 1888. Pedipalpi E Scorpioni Dell' Archipelago Malese. *Ann. Mus. Civ. Genova.* **26**:327-428.
- . 1889. Aracnidi Artrogastri Birmani. *Ann. Mus. Civ. Genova.* **27**:521-562, pl. 5.